



PROTECT YOUR DRINKING WATER

Safe and healthy lives in safe and healthy communities

North Kingstown Drinking Water Assessment Results

Groundwater provides the only source of drinking water for all North Kingstown residents and businesses. The North Kingstown Water Department maintains 10 wells withdrawing water from the town's underground sand and gravel aquifers. Ninety four percent of residents rely on this municipal supply while those in outlying areas depend on private wells. The RI Economic Development Corporation (RI EDC) also operates three wells in the Hunt aquifer, serving approximately 5,000 persons daily at the Quonset Davisville Port and Commerce Park. The North Kingstown and RI EDC wells are sited in groundwater "reservoirs" where water-bearing sand and gravel is thickest, providing a reliable and pure source of supply.

The North Kingstown and RI EDC wells are located within four distinct "wellhead protection areas" – the critical zone that recharges a well or group of wells, and the focus of this study. The wellhead protection areas for the North Kingstown supplies fall within town boundaries, except for the Frenchtown wellhead protection area, which straddles the borders of North Kingstown, East Greenwich, and Warwick.

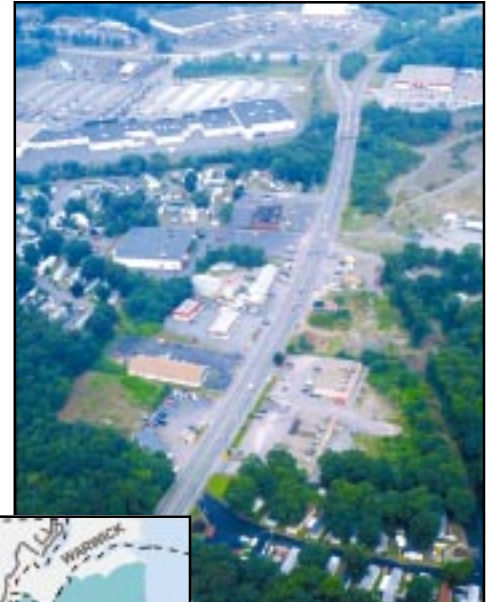
Key Findings

North Kingstown's groundwater supplies are finite, irreplaceable, and highly vulnerable to contamination. To protect this valuable resource, the Town has a long record of groundwater planning, adoption of groundwater zoning and other ordinances, land acquisition, and groundwater education for residents.

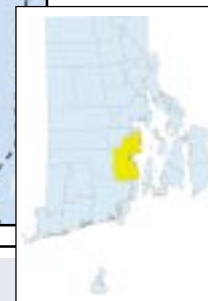
- Pollution risks for North Kingstown supplies are low overall but wellheads in the Hunt aquifer are threatened by commercial, high-way and dense residential development. Highly permeable, sandy soils provide little defense against direct movement of pollutants into groundwater. Some wells have elevated nitrogen levels – underscoring the need to maintain and upgrade septic systems and control fertilizer use.

- Low density zoning in rural and suburban recharge areas limits development potential and keeps future pollution risks in the low to moderate range. However, actual impacts are difficult to predict and depend on how landowners manage their property and continued implementation of local protection measures.

- North Kingstown's groundwater aquifers yield a high quality supply that meets all standards without the need for treatment. Continued adoption of protection measures by all communities that share groundwater aquifers will help ensure future quality and avoid the need for additional treatment that can affect drinking water taste and odor.



Strip commercial and dense residential development in the Frenchtown wellhead protection area. Looking north along Route 1 to the intersection of Frenchtown Road. Photo courtesy of Peter Flinker, Dodson Associates.



North Kingstown study area

Source Water

The focus of this assessment is on public drinking water supply "source" areas – the wellhead protection area that recharges a well or the watershed that drains to a surface water reservoir. Source water is untreated water from streams, lakes, reservoirs, or underground aquifers that is used to supply drinking water.

This fact sheet summarizes results of a source water assessment conducted for the North Kingstown Water Department and the RI Economic Development Corporation. It identifies known and potential sources of pollution in drinking water supplies and ranks their susceptibility to future contamination. The goal of this study is to help water suppliers, local officials and residents living in drinking water supply areas to take steps to keep water supplies safe.

Assessment results for the Kent County Water Authority, which has an active well in the Frenchtown wellhead protection area, are reported in a separate fact sheet.

Land Use & Threats to Water Quality

To locate high-risk features most likely to affect water quality, this study evaluated and ranked each wellhead protection area based on land use and natural features including the percentage of high intensity land uses, the number of sites where hazardous materials are used, and estimated nutrient sources such as septic systems and fertilizers. A rating from high to low was assigned to each factor and summed to create a pollution risk score for each study area, and an average susceptibility rank for each water supplier. To support town planning, the Hunt groundwater reservoir and a proposed North Kingstown wellhead protection area were also evaluated. Results are presented in the full assessment report.

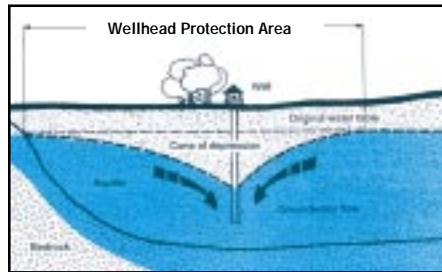
Susceptibility to Contamination



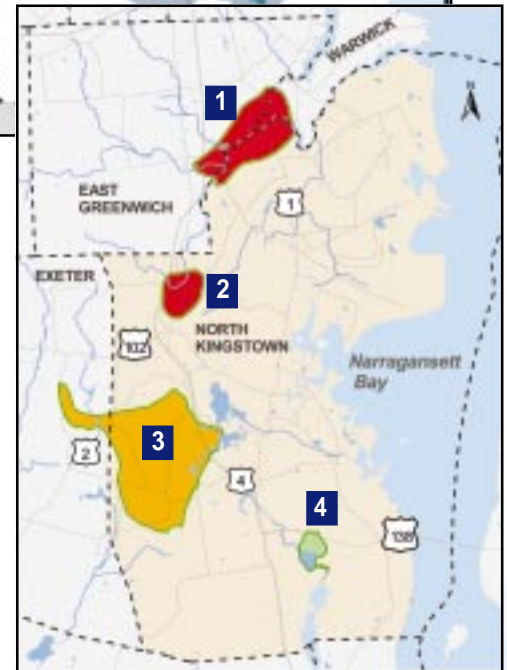
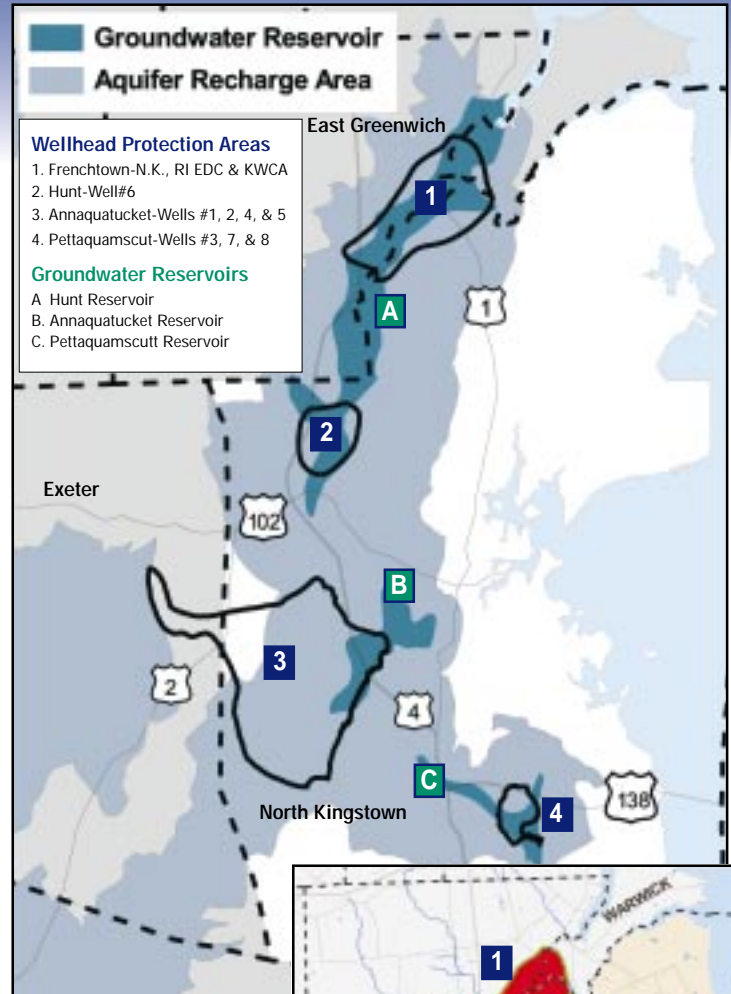
Town of North Kingstown RI Economic Development Corporation

The results show that the North Kingstown water system has a low susceptibility to contamination overall. The RI Economic Development Corporation supply is moderately susceptible to contamination. This is an average ranking for each water supplier based on basic land use features and existing water quality. Individual wellheads may be more susceptible to contamination. Additional land use factors used to assess major supplies may also result in a higher risk score for individual study areas.

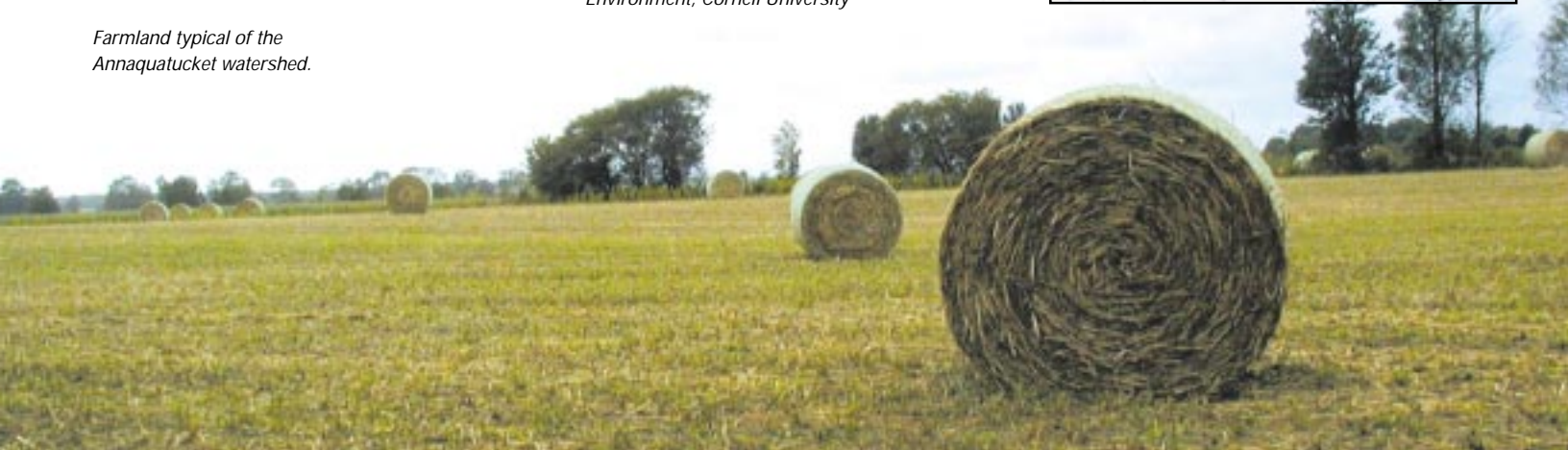
Note: A low ranking does not mean that the source is free from contamination risk. Some contaminants can affect taste, odor, and cost of water treatment at levels below safe drinking water standards. Without sufficient protection, any water supply can become contaminated.



A wellhead protection area is the land surrounding a well where infiltrating rainwater recharges groundwater flowing to a well or cluster of wells. Within a wellhead protection area pollutants entering groundwater can easily reach a pumping well. Source: Center for the Environment, Cornell University



Farmland typical of the Annaquatucket watershed.



Wellhead Protection Areas:

Frenchtown & Hunt Well #6

Current Condition

The Frenchtown wellhead protection area is located in the Hunt aquifer, where the boundaries of North Kingstown, East Greenwich and Warwick meet. The protection area is shared by the three municipalities and three water suppliers: North Kingstown, RI EDC, and Kent County Water Authority.

- The Frenchtown wellhead is the most urban and at greatest risk of spills and leaks from underground storage tanks and businesses that use or store hazardous materials.

- Sewers in the East Greenwich portion of the Frenchtown wellhead area help reduce risk of groundwater contamination provided sewer lines and pump stations are checked for leaks. The dense concentration of septic systems in this area is considered responsible for elevated nitrogen levels found in some wells. Closer monitoring of commercial systems and selective use of advanced treatment systems would control nitrogen inputs and reduce risk of other wastewater pollutants.

- The North Kingstown Well # 6 wellhead protection area is highly developed with businesses and homes on 1/4 to 1 acre size lots covering half the wellhead. This area is a priority for septic maintenance and upgrading of substandard septic systems.

- The amount of pavement and other impervious cover in both areas, at about 25 - 30 percent represents a high risk to stream quality from polluted runoff and loss of recharge to groundwater.

Future Threats

The Well # 6 wellhead is largely “built out” with little developable land remaining. Seventeen percent of this area is permanently protected. In the Frenchtown wellhead commercial and industrial uses could increase from 17 percent of the wellhead area to 22 percent with further growth.

There is concern that pumping capacity for the three water suppliers may exceed the estimated safe yield for the aquifer. Although the three towns and water suppliers cooperate in groundwater planning, multiple jurisdictions complicate implementation of protection measures.

Annaquatucket & Pettaquamscutt

Current Condition

The Annaquatucket wellhead protection area for wells # 1,2,4, and 5 extends from Exeter to Belleville Pond and Secret Lake. This is still largely rural, with about one quarter of the area agricultural and another quarter permanently protected open space. Farm fertilizers and pesticides, landfills, and scattered pockets of intense land use increase pollution risks locally but overall threats range from low to moderate.

Wells 3, 7, and 8 in the Pettaquamscutt wellhead protection area serves the Saunderstown area. Located near Carr Pond at the headwaters of the Narrow River, this protection area is almost completely undeveloped.

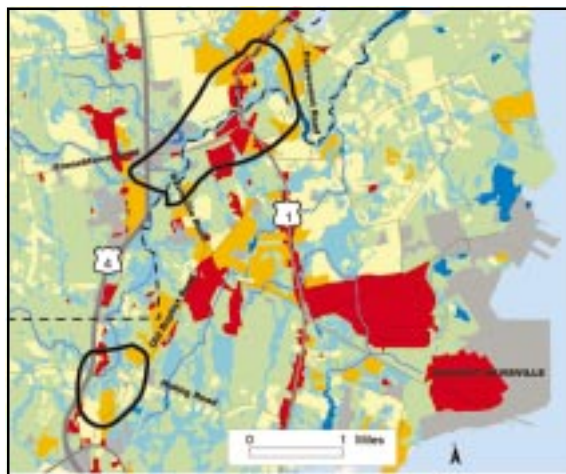
Future Threats

Under current zoning almost one third of the Annaquatucket wellhead area could be converted from farmland and forest to home sites; light industry could expand by 200 acres. Expected impacts include a jump in impervious from low to high levels, with potential impacts to stream quality and loss of recharge unless stormwater runoff volume is controlled. In the Pettaquamscutt wellhead area, 40 percent of the forest could be fragmented by house lots.

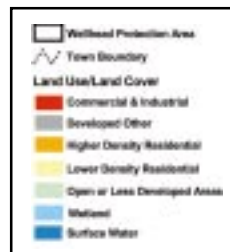
Nutrient inputs are expected to remain the same or decrease but runoff, septic systems and lawn fertilizers will become the dominant sources. Actual impacts are highly uncertain and may be much greater if landowners develop their properties intensively and if highly marginal sites are developed.

CURRENT LAND USE

Frenchtown & Hunt Well #6 Wellhead Protection Area



Annaquatucket & Pettaquamscutt Wellhead Protection Area



Secret Lake. Photo courtesy URI Watershed Watch.

What You Can Do to Protect Water Quality

Municipal Boards and Government

North Kingstown has a longstanding groundwater protection program that includes: establishment of a Groundwater Committee, groundwater overlay zoning, septic system inspections, public education, and regional planning. The town's complete dependence on sole source aquifers, existing high risk development, and unrelenting growth pressures all point to the need for continued implementation of protection measures. The following recommendations are intended to safeguard current and future drinking water quality while also protecting the quality of wetlands and surface waters.

Town Planning and Land Use Ordinances

- Designate a working group to review assessment results, select priorities, and incorporate key recommendations into town plans and ordinances. Continue regional planning in the Hunt Aquifer. Coordinate drinking water protection with Phase 2 Stormwater Plans.
- Expand community pollution prevention education in Warwick and East Greenwich. Start by mailing this fact sheet to aquifer residents.
- Adopt model practices at municipal garages, schools and parks.

Hazardous Materials

- Review and update groundwater zoning as needed to prohibit new facilities using or storing hazardous materials. Require existing facilities to upgrade to state-of-the-art pollution prevention controls with expansion or redevelopment. Retrofit stormwater systems to treat runoff from gas stations, convenience stores and other high-use areas.
- Coordinate with RI DEM annually to review facility inspection results, monitoring, and compliance records. Promote employee education and voluntary participation in pollution prevention inspections.
- Prohibit disposal of "clean fill" and other construction waste in aquifer areas.

Controlling Runoff and Nutrients

- Use zoning setbacks for maximum protection of public and private wells, small headwater streams and wetlands.
- Set targets for maximum impervious cover at current levels or no more than 10 percent in less developed areas. Limit site disturbance and keep runoff volume at pre-development levels. Update site design and stormwater runoff controls to treat and infiltrate runoff.
- Use conservation development to preserve permeable soils as open space for stormwater recharge.

Managing Wastewater/Keeping Septic Systems Functioning

- Inspect and maintain sewers to prevent leakage and infiltration (East Greenwich).
- Expand or adopt septic system management program to phase-out cesspools, prevent new construction in marginal sites, oversee maintenance of commercial systems, and require advanced treatment for large systems and those in critical locations.

Water Supplier

- Implement recommendations of the latest water supply system management plan.
- Continue to acquire land for protection.
- Work with local officials to implement land use protection measures and education programs.
- Inspect water supply and protection area regularly for potential pollution sources.

Homeowners

Recycle oil and dispose of other hazardous materials properly. Maintain wooded buffers or restore natural vegetation along wetlands or watercourses that run through your property. Reduce fertilizer and pesticide use. Limit watering.

All septic systems need regular care to function properly and avoid costly repairs. Inspect annually and pump tank when needed, usually every 3-7 years. For information contact URI Home*A*Syst (401) 874-5398, www.uri.edu/ce/wq

Farmers and Landowners

Work with the USDA Natural Resource Conservation Service to develop a conservation plan that addresses proper nutrient, manure, pest, and irrigation water management. Contact them at (401) 828-1300, www.ri.nrcs.usda.gov

Commercial and Industrial Businesses

Adhere to all laws, regulations, and recommended practices for hazardous waste management, above and underground storage tanks, and wastewater discharges. Check local regulations with city/town hall and state regulations with the RI DEM Office of Water Resources (401) 222-4700, www.state.ri.us/DEM/program/benviron/water/index.htm

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For More Information

- **R.I. Department of Health, Office of Drinking Water Quality**, (401) 222-6867, www.HEALTH.ri.gov/environment/dwq/Home.htm
- **URI Cooperative Extension Nonpoint Education for Municipal Officials (NEMO)** (401) 874-2138, www.uri.edu/ce/wq
- **North Kingstown Water Department** (401) 294-3331, www.northkingstown.org/waterdept
- **The RI Economic Development Corporation** (401) 222-2601, www.riedc.com

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